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ABSTRACT

This booklet describes the program in Harlem (PS 133) which is based upon Dr. Caleb Gattegno's reading and mathematics in color. The program was primarily intended to test the teaching of Gattegno's methods and materials. PS 133 was considered to be a good site for the program because it was stable, pedagogically traditional, and staffed by a large number of experienced teachers and a principal who was known to be a dedicated, competent administrator. In Gattegno's reading program, color is used only for the purpose of introducing words, and once sounds are mastered, color is discarded. The use of color simulates a phonetic language. All groups of letters with the identical sound are represented by the same color. Thus the "o" in "so," "know," and "though" belong to the same group. In the mathematics program, Gattegno used the colored rods of Georges Cuisenaire in order to represent basic mathematical operations as well as fractions. Gattegno claims that students move rapidly from the use of the rods to abstraction and mental computation in order to derive answers to problems. The evaluation of the program used data from the Metropolitan Achievement Test scores; the results tended to indicate general improvement in reading and mathematics among the experimental group. (Author/JW)

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PRS 002

A Report by the Program Reference Service

Beginning Reading and Math in PS 133 / New York City

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Richard Schwartz
Ellen Saxl

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Under the direction of its Dissemination Division, the Center publishes a wide variety of reports, monographs, books, and bibliographies. A complete list of those items in print is available on request.

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As a unit of the Dissemination Division, the Program Reference Service identified examined, and provided information on programs in grades K-6 which deal with the problems of urban school systems. Its reports have been designed to meet the stated needs of school administrators and other educational decision-makers, and are offered as informational aids to effective educational planning. This report was prepared under the direction of Joseph Pincus and completed in September, 1970.

The Program Reference Service wishes to express its thanks to the principal of P.S. 133, Mrs. Dellora Hercules, and her staff for their cooperation in the preparation of this report, to the Schools for the Future staff for their assistance, and to Ruth Dropkin, Senior Editor of CUE, for editorial revision.

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1 Background Information

Since the fall term of 1968, PS 133 in Manhattan's Harlem has been engaged in a program that challenges a number of accepted assumptions about the ways children learn. "Schools for the Future," the project's formal title, is a beginning reading and mathematics program based on the approach and methodology developed by Dr. Caleb Gattegno as Words in Color and Mathematics in Color. As the originator and director of the Schools for the Future Corporation, Dr. Gattegno has had a long record of success in teaching reading and mathematics to children in New York City, in other sections of the United States, and in several foreign countries. In 1967 when Dr. Gattegno's work was brought to the attention of the Center for Urban Education, the Center proposed a joint project with the Schools for the Future Corporation.

Project Aims

The program was primarily i
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Project Aims

The program was primarily intended to test the teaching of reading and mathematics through the use of the Gattegno methods and materials. The project's overall aim was to determine if teachers in the primary grades can be helped in one school year to acquire what is needed to allow *all* children to demonstrate their capacity for:

a. mastering the skill of reading with comprehension;

b. using the written language to express experiences with which they are familiar;

c. mastering computational operations with numbers of *any* size and *any* base and applying these skills to their everyday experience;

d. enjoying school work, as represented by the volume of *free* composition produced by the child in English and mathematics.

The School

PS 133 was considered to be a good site for the program because it was stable, pedagogically traditional, and staffed by a large number of experienced teachers and a principal who was known to be a dedicated and competent administrator. Both the administration and staff of the school were considered to be not only amenable to the introduction of the program but also, once committed, able to fulfill their obligation to devote a year to the implementation of the new methods. It is important to note that PS 133's affiliation with a decentralized demonstration district (IS 201)* facilitated decision-making at the local level. The Governing Board, with its parent members, the IS 201 Educational Research Committee, and the Unit Administrator had created a climate that was favorable to innovation and one which would guarantee the program a sustained hearing.

**The IS 201 demonstration district is now officially designated as the Arthur A. Schomburg IS 201 Educational Complex and is part of District 5.*

Preparations

Because the school was not contacted until June 1968, steps had to be taken rapidly in order to acquaint the teachers and parents with the plans for the new program before the end of the school year. The IS 201 Educational Research Committee met to discuss the Gattegno program and to examine its effectiveness in the materials submitted by the Corporation—or original stories and lengthy mathematical equations composed by first grade pupils who had participated in a Schools for the Future program.

The teachers of grades one and two at PS 133 were also approached, and had an opportunity to talk about the materials and methods. They were impressed with the level of work being done by students in schools using the program. According to Mrs. Dellora Hercules, the acting principal, the teachers indicated that the approach was "something really new, rather than a rehash of old methods."

Since the Schools for the Future program emphasizes teaching beginning reading and mathematics, permission was sought to have the kindergarten included. However, because a prior commitment had been made to the Bank Street College of Education for continuation of a previous program in the kindergarten classes, the third grade was fitted into the framework of the proposal.

As soon as Mrs. Hercules made certain that all teachers of the first three grades were willing to use the new system in their classes, the permission of the IS 201 Unit Administrator was requested and obtained. The project was then approved as a one-year experiment, to be funded by the Center for

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2 School Setting

Facilities

One of four feeder schools in the IS 201 demonstration district, PS 133 commands a square block on upper Fifth Avenue. The school serves kindergarten through fifth-grade students and also maintains a prekindergarden that is open to the first 30 four-year-old children who register for it. The students reside in a compact attendance zone within a radius of approximately four city blocks.

The building was erected in 1949, and is kept neat and in good condition. It contains 25 classrooms as well as a large auditorium, gymnasium, a lunchroom, a library, and sufficient office space for its administrative and special staff. Some extra classroom space became available when the sixth-grade classes moved to IS 201 in 1965, and this space is now used for art, Afro-American history, and corrective reading classes. The large outdoor yard is used by the students during recreation periods, lunch hours, and the school's after-hours program.

Student Population

The school's enrollment of 58(dren is 98 percent Negro and 2 p Puerto Rican. Although the scho scribes the student population as stable," there has been a turno about 20 percent during the 1 school year. The children live subdivided brownstones and tene characteristic of the attendance except for a number of childre come from two large high-rise bui in a low income housing project edge. Almost all the children ar low-income families, many of whi on welfare. All pupils are eligib free lunches and a majority tak vantage of this program.

During the 1968-69 school ye pupils in the first through third participated in the Schools for t ture program. Although the deg pupil mobility accounted for son iation through the year, at any o there were about 275 children program. They were grouped classes—4 first grade, 4 second and 3 third grade. In additio school's guidance class of eight st and one fourth-grade class made the materials and methods.

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Student Population

The school's enrollment of 530 children is 98 percent Negro and 2 percent Puerto Rican. Although the school describes the student population as "quite stable," there has been a turnover of about 20 percent during the 1968-69 school year. The children live in old subdivided brownstones and tenements characteristic of the attendance zone, except for a number of children who come from two large high-rise buildings in a low income housing project on its edge. Almost all the children are from low-income families, many of which are on welfare. All pupils are eligible for free lunches and a majority takes advantage of this program.

During the 1968-69 school year, all pupils in the first through third grades participated in the Schools for the Future program. Although the degree of pupil mobility accounted for some variation through the year, at any one time there were about 275 children in the program. They were grouped in 11 classes—4 first grade, 4 second grade, and 3 third grade. In addition, the school's guidance class of eight students and one fourth-grade class made use of the materials and methods.

At PS 133 in accordance with general New York City practice, children on each grade level are homogenously grouped on the basis of prior achievement. The decision in first grade is determined by the kindergarten teachers' individual estimates of the children's reading readiness and maturity; second-grade groupings are made on the basis of accomplishment in first grade; and third-graders are placed according to their reading test performance as well as the evaluation by their second-grade teachers.

Within each class, children are further grouped according to their current academic progress. In the first grade, the Schools for the Future program has resulted in a reorganization of the formerly self-contained classes through interclass groupings of children for reading and mathematics. Rather than signalling a complete departure from established policy, however, this appears to function as a refinement of the "ability-grouping" approach practiced by the school.

Personnel

As one of New York City's Special Service Schools, PS 133 maintains a teacher-pupil ratio of approximately 1:25, and a wide range of auxiliary services and personnel.*

General School Staff

Of the 28 full-time teachers in the school, 23 instruct individual classes. Others are responsible for corrective reading, Afro-American history, art, and the library; and one full-time teacher works with children in grades one and two on the development of language skills. Twenty-three of these teachers have been regularly licensed by the New York City Board of Education; the remaining five hold substitute licenses. Almost all have been with PS 133 for at least five years.

The school usually has two full-time guidance counselors; however, one was on sick leave during the second half of the 1968-69 school year. Also on the staff are a kindergarten coordinator, a dental hygienist, a school nurse, a public health assistant, and a speech therapist who is available for one and one-half days a week.

**Special Service Schools have been described as "the city's most comprehensive effort to extend additional educational and related services to those children most in need of them . . . Schools are selected on the basis of a combination of criteria involving IQ and reading test results, measures of pupil and teacher mobility, the extensiveness of the free lunch program, and the proportion of non-English speaking pupils. Generally, the additional services provided under this canopy of Special Service involve supplemental personnel assignment and result in smaller class sizes and a more favorable proportion of guidance counselors, secretaries, librarians and so forth." (Sheldon and Glazier, "Pupils and schools in New York City.") In the 1968-69 school year the average additional per pupil expenditure in Special Services Schools has been estimated by the New York City Board of Education to be $101.00.*

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The school's paraprofessional staff of 32—composed of school aides, teacher aides, educational assistants, and family workers—performs a variety of clerical, instructional, and social-service functions. Most aides and family workers have been drawn from the neighborhood surrounding the school as part of the district's attempt to establish closer home-school relationships.*

The principal of the school is on an extended sabbatical that began in February 1968; and for this period, Mrs. Dellora Hercules, the former assistant principal, has been in charge. As acting principal, she has the help of two teachers who function as acting assistant principals.

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**The IS 201 "Community Information Manual" states that "parents and other community residents can get school positions and work their way up — while taking the high school and college courses they need at the same time"*

Program staff

During the 1968-69 school year, the Schools for the Future program utilized all of PS 133's regular classroom staff in grades one through three, plus a number of special consultants and advisors. Included were:

Teachers (eleven; full-time)

Each of the 11 women (four white, seven Negro) was assigned to one of the 11 classes in the program. They were regularly licensed, had from five to 15 years of classroom experience, and had been at PS 133 for a minimum of five years. All were asked to participate in the program, and each gave her assent before the decision to establish the program in the school was made final. All gave up free periods during the school day; several stayed after school and contributed weekends during the school year and two weeks during the summer in order to be trained to perform effectively in the program.

Educational Assistants (five; ful

All were women high school gr drawn from the surrounding comm With the agreement of the cla teachers two assistants were assig the two lowest-ranked first grade two alternated weekly between tw ond-grade classes, and one was as to the middle-level third-grade cl their classrooms they taught groups, worked with individual st and assumed a number of clerical The assistants were trained in the the program by the consultants a teachers; one attended seminars Schools for the Future office.

Consultants (two; full-time)

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Educational Assistants (five; full-time)

All were women high school graduates drawn from the surrounding community. With the agreement of the classroom teachers two assistants were assigned to the two lowest-ranked first grade classes, two alternated weekly between two second-grade classes, and one was assigned to the middle-level third-grade class. In their classrooms they taught small groups, worked with individual students, and assumed a number of clerical tasks. The assistants were trained in the use of the program by the consultants and the teachers; one attended seminars at the Schools for the Future office.

Consultants (two; full-time)

Both have worked with the Schools for the Future Corporation for five years, and have considerable experience with the program. Their responsibilities at PS 133 were extensive. They taught a full week at the school and conducted a two-hour after-school seminar on Monday afternoons. Their schedules varied from week to week, subject to teacher absences and such activities as class trips and play rehearsals, but they generally devoted large amounts of their time to teaching classes, observing and aiding teachers in the use of program materials and methods, conducting grade conferences, and instructing small groups of individual students requiring additional help in reading or mathematics. Over the course of the year, both consultants established comfortable collegial relationships with most of the classroom teachers.

Advisors (one; part-time)

Dr. Caleb Gattegno, Executive Director of the Schools for the Future Corporation, who designed and developed both Words in Color and Mathematics in Color, played an important part in their implementation in PS 133. His visits to the school included teaching and observation in the classrooms, discussions with the teachers, and participation in an introductory workshop for parents. Additionally, both consultants conferred with him at length at least once each week during their year in the school. Throughout the year he conducted a number of workshops and seminars at the Schools for the Future offices in which aides and teachers from PS 133 were able to participate.

To a more limited degree, several other associates of the Corporation were used as resource persons, mostly in the early months of the fall term.

3 Words in Color

Gattegno's fundamental theories about learning are central to his methods of teaching reading and mathematics. In his view children possess powerful resources for mental abstraction before they reach school age. The most clear example lies in their mastery of speech which, according to Gattegno, is

> . . . concerned with the organization of parts of one's body to produce definite sounds in a definite sequence in order to convey a meaning. Beginning readers are thus highly knowledgeable and skilled in a number of ways which they demonstrate by being capable of translating meaning into adequate sequences of sounds (words and sentences) which include such elements as stress, emphasis, intonation, timbre, structure, and a number of other dimensions unconsciously brought in to serve the end or communication. It is the intuition or awareness of meaning on the part of the speaker that calls up the adequate words to produce the proper flow of speech. In speaking we translate meanings into words and into their accompanying supporting nonverbal form . . . We all learn how to do this quite early in life. *(R4, p. 3)*

How Children Learn Speech

In order to apprehend record speech, that is, written language, must, according to Gattegno, "liste to the movement and rhythm of sent ces in much the same fashion as listen to someone's speech. The spok word, "actually or potentially, with of its characteristics," *(R4, p. 3)* exi in all written material, and readi therefore, is basically the restoration the voice to the printed page. T teacher of reading, asserts Gatteg must help "the learner to understa the connection between the temporal pect of spoken speech and the spat arrangements of print." *(R4, p. 3)* F example, reading English involves proper movement of the eye so th signs in words (and words in sent ces) are scanned from left to right; recognition that the order of words sentences is in the same direction; a that it is only when the sentence is f ished that its full meaning can be e trapolated. It is clear, Gattegno ma tains, that when we write the letters signs of a language we follow a certa temporal order, as well as when we sc lines and words to determine what it they are intended to express.

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How Children Learn Speech

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How and When They Learn

"Time," Gattegno insists, "is ordered but not reversible," a notion that helps to explain why "in different languages the direction in which speech is recorded or written down can be chosen arbitrarily"; *(R4, p. 3)* from the left or from the right in some, horizontally or vertically in others. All languages, however, in their written or spoken form, adhere to a definite temporal sequence. For instance, the full meaning of the spoken word can only be conveyed to the listener when the speaker has used the appropriate stress, emphasis, and rhythm. The dimension of time is of critical importance when reading orally, if words are not to be artificially segregated and read in isolation from other words in the printed line. Hence, it is a significant advantage when readers can be induced to read in the manner of everyday speech, scanning groups of words with comprehension, instead of uttering individual words mechanically. In some languages each sound corresponds to a single sign (the phonetic); in others many irregularities exist between the spoken and the written word (the nonphonetic).

Most learners are able to assimilate the elementary process common to all language—phonetic and nonphonetic —of "translating speech into print (writing) and print into speech (reading)." *(R4, p. 3)* What is crucial is "*the integrative schema* that makes sense of the activity for the learner himself and develops like all biological activities—for mastery and immediate use and then toward independence through automatization." *(R5, p. 4)*

Teacher and Learner

A decisive element is the relation between the teacher and the lear The Gattegno approach subordinates role of the teacher to that of learner. One of Gattegno's strong criticisms of existing methods, in f is that they are simply a way of tra mitting what the teacher has learn "Delegation of responsibility for lea ing to the learner at once and all time is indispensable." *(R5, p. 4)* most teachers who adopt Gattegn methodology, this orientation usu requires a fundamental reconceptu zation of their role and, as a result, t may find it necessary to abandon s inherited doctrines as the role of alphabet in teaching reading and w ing, the belief that phonics or wh word sentence presentations are only approaches to reading, the idea t the quality of the language spoken the student is a function of his soc economic background, and the not that it helps students to give them swers and to correct their errors.

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Gattegno's insistence upon the development of independence by the learner does not derive from an exaggerated individualism on his part, but rather from the recognition that it is the pupil who must learn how to read and write, and compute, and that it may not assist the learner for the teacher to demonstrate her mastery of the subject. If the teacher is not aware "that what is to be communicated is meaning through finding speech in print in a natural way, or . . . that learning requires concentration without distraction, then learners have trouble." *(R4, p. 4)*

Codification of Spoken Speech

The basic task in reading is to master a codification of spoken speech. Recognizing that the signs of a written language are arbitrary conventions, Gattegno invented a device to make nonphonetic languages (such as English) resemble phonetic ones without increasing the alphabet.

- *Words in Color* reduces sound-sign relations to a one-to-one correspondence. It organizes English as a phonetic language of 48 sounds and it uses color as an indication of sound; identical colors are used for all orthographic varieties of identical sounds.
- Color, Gattegno claims, is an easier medium to use to simulate a phonetic language than, for instance, the use of underlining, crossing out, or altering the shape of the letters, because it does not change traditional orthography.
- The program is built around sounds, for the sound-color relations remain constant.

Color as a Sound Indicat

Color is used only f
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Identical Sounds

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Color as a Sound Indicator

Color is used only for the purpose of introducing words, and once sounds are mastered, color is discarded. From the start the pupil writes in his book and on the blackboard in black and white. Color, in addition, tends to make the learner more conscious of similarities and differences in sounds, since a sign is referred to by its color instead of by its sound or name. For example, seven different colors are used to represent seven different sounds for the vowel *e*, thus demonstrating that the sound of *e* in "he" is very different from the sound of *e* in "pet." Also by using the same color for the vowel *a*, as in "all," and for *o*, as in "for," the similarity of sound is established.

Identical Sounds

In Gattegno's scheme all groups of letters with the identical sound are represented by the same color. Thus the *o* sounds that occur in "so," in "know" and in "though" all belong to the same group, and the letters "o," "ow," and "ough" appear in only one color. Pupils are trained from the beginning that a color represents a single sound.

A Beginning Vocabulary

In constructing words by combining signs, Gattegno suggests the use of a "language" composed of a specially selected and restricted vocabulary of sounds. In this arbitrary language the student first masters the short pronounciations of the five vowels (the *a* as in "at", *e* as in "pet"), calling each one by its appropriate color.

The sound *a* is introduced first, and since there is only one sign for this sound the danger of confusion is avoided. "Repetition of the sign, of its associated sound, or the cessation of such sound—these are the only activities possible." (*R4, p. 10*)

The teacher then writes several groupings of *a* on the board in horizontal lines (for example, *a aaaa aa a*) and, through the use of a pointer, taps out different rhythms. By chanting the sounds in the rhythm tapped out, the students perceive that written "words" are separated from one another by a space larger than that between the letters within a word, and that in reading,

the decoding moves from left to right. This technique, which Gattegno terms "Visual Dictation," is then repeated for all other sounds and their signs. As more signs are presented the sounds and words are combined and recombined in ways similar to the mathematical processes of addition, subtraction, transformation, and reversal. At the introduction of each new sound, the teacher is encouraged to adopt the procedure of uttering the corresponding sign "once and once only," and to refer to it only by its color name.

Materials Available

In using the *Words in Co* niques, various materials a available to the children. Thes 21 word-charts, which contain words in color; the "Fidel," chart tableau of every orthogra iant of the 48 sounds of the language organized in columns that is, sound. (The word, Fid rived from Amharic, the off guage of Ethiopia.) The stud specially designed "Worksheet test their skills through word games, and books and reader ized sequentially, which are p conventional fashion. There word cards which help to intr fundamentals of grammar once dren are proficient readers. A pils achieve a certain amount with words and sentences, st introduced. This is done con with the use of a pack of ca taining words the teacher ca from to form sentences. As m more words are encounte grasped, the stories becom complex.

Materials Available

In using the *Words in Color* techniques, various materials are made available to the children. These include 21 word-charts, which contain over 600 words in color; the "Fidel," an eight-chart tableau of every orthographic variant of the 48 sounds of the English language organized in columns by color, that is, sound. (The word, Fidel, is derived from Amharic, the official language of Ethiopia.) The students use specially designed "Worksheets," which test their skills through word-building games, and books and readers, organized sequentially, which are printed in conventional fashion. There are also word cards which help to introduce the fundamentals of grammar once the children are proficient readers. As the pupils achieve a certain amount of facility with words and sentences, stories are introduced. This is done concurrently with the use of a pack of cards containing words the teacher can select from to form sentences. As more and more words are encountered and grasped, the stories become more complex.

Because the *Words in Color* program is designed not only to teach reading but also to serve as an "extension of intellectual and linguistic powers" *(R4, p. 1)*, it embraces a large-scale language arts program, including reading comprehension, meaningful creative writing, and accurate spelling.

Daily Time Spent

At PS 133, the teachers devoted a minimum of one to two hours each day to intensive work with the *Words in Color* materials. Most teachers closely followed the plan described in *Teaching Reading with Words in Color*. Gattegno claims there is no necessity to follow this plan; nevertheless, in its adherence to the order of the *Words in Color* charts, it has provided a useful guide for teachers working with this method for the first time.

Techniques Used

Each teacher worked with her class as a whole since all the students needed an introduction to the system. She began with the techniques of Visual Dictation. Visual Dictation 1, the process of making "sentences" with sounds, has already been described; Visual Dictation 2 makes a sequence of words whose meanings form a sentence; Visual Dictation 3 entails using the pointer to indicate a sequence of sentences which form a story. The children responded quickly to the use of the pointer and, once they understood its function, were allowed to come to the board (and later to the charts) to direct their classmates in Visual Dictation. This practice is intended to strengthen the development of the child's sense of power and independence, both of which are vital in order for him to move ahead. The students seem to enjoy the opportunity.

Using colored chalks, the teacher followed a similar procedure to introduce the other vowels. Once these were mastered, she posted Word Chart 1, a visual representation of the five vowels, separately and in combinations. As the rest of the charts were introduced in sequence during the year, they were mounted on a pulley mechanism above the wardrobes in the classroom and were lowered when in use.

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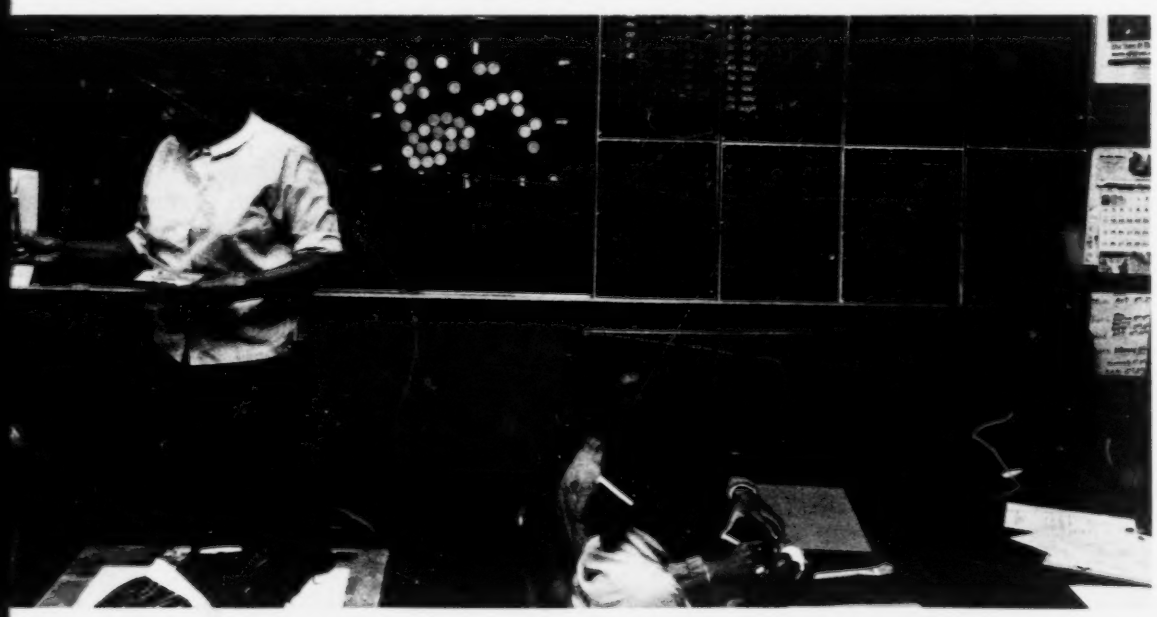
The children were next introduced to consonants, beginning with dark brown (*p* as in "pot"), in conjunction with the vowels they had already mastered. Of the many syllables produced by the students, only a few were English words; however, the teachers did not draw attention to this fact. As the teachers began to eliminate the distortion of sound due to stress the students formulated words from these syllables, and phrases such as "pop up" were forthcoming. Following this, different sounds for the same sign were introduced. The children learned the distinction, for instance, between the two sounds of *s* as in "is" (referred to as lilac) and as in "us" (referred to as lime green).



"Games"

When this had been achieved the students began work on Chart 2, which lists a number of words composed of nine signs. With Chart 2, the students were introduced to a technique central to the program, "The Game of Transformations," in which operations are performed on a group of sounds so as to produce several different words.

Gattegno labels many of his exercises "games" because he believes that games are a natural form of learning for children. In his view children accept the rules of a game and play it seriously. Games can readily be applied to the skill of reading in which the child must accept as rules certain conventions of the English language (e.g., you decode a word starting from the left). A basic premise of *Words in Color* is that children will react positively to the "games," successfully mastering each one and looking forward to the challenge of the next. The children do seem to accept without confusion what adults might consider complex exercises. Exercises not only build upon the child's ability to isolate sounds but also stimulate his desire to generate more words within his restricted vocabulary.

In the Game of Transfo
the links-by-transformation
picted as follows (the letters
i are guides for the teacher)

s indicates substitution *as*
a indicates addition *at*
r indicates reversal *pat*
i indicates insertion *tap*

The teacher asks the stud
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In the Game of Transformation all the links-by-transformation may be depicted as follows (the letters *s, a, r,* and *i* are guides for the teacher) :

s indicates substitution	*as*	s	*at*
a indicates addition	*at*	a	*pat*
r indicates reversal	*pat*	r	*tap*
i indicates insertion	*tap*	*i*	*trap*

The teacher asks the students to devise variations on the words in Chart 2, performing any of these operations. Some teachers at PS 133 began with a word at random and then indicated another word that they wanted to end with. It is important to note that because signs and not letters are used (e.g., *ough* has the same value as *o*), it is acceptable to move from the word "pat" to "pass" in only one step substitution.

Subtraction is not part of the Game of Transformations because Gattegno feels that it would make the game too easy. The fact that the Game of Transformations "can be played so early in the program is a remarkable tribute to young children's word sense and linguistic powers." *(R4, p. 30)* Gattegno states that this skill of transformation is acquired naturally by children because they have been performing similar operations in their speech for years.

The teachers at PS 133 often used the Game of Transformations as a verbal exercise with the whole class. Students were also required to do the exercises in their notebooks using, if necessary, the *Words in Color Worksheet* as an aid.

"First Reading Certificate"

By mastering these activities and the words on Chart 2 the children earned what Gattegno calls "the first reading certificate." This "need not require more than the first few hours at school for ordinary first graders, being completed as part of the first week's work." *(R4, p. 53)* Although they seemed to be grasping the rudiments of the program, most children did not progress at the rate of speed indicated in the teacher's guide.

Time Required

The estimates of the amount of time required for various steps in the program have been a source of contention among a number of educators familiar with the *Words in Color* system. Gattegno has stressed the point that *Words in Color* can change the whole approach to teaching reading because it can be mastered so quickly. In *Words in Color,* Background and Principles, he states that "On the average, it is estimated that most adult learners can master the reading and writing of English by this method, in 20-25 lessons, and young learners in school can achieve mastery in 35 to 40 lessons, or in about eight school weeks." *(R5, p. 70)* Various reports on the implementation of the program in different schools have pointed out that this estimate is misleading; and in one instance, it was said that Gattegno does himself a great disservice by claiming to accomplish so much in so short a time. It appears that Gattegno's claim that children possess the mental power to learn to read in the time he allots is valid only if the circumstances are right. This estimate is applicable when the teacher is one who had experience with *Words in Color* and is able to stimulate the children to "plan the games" with intensity and concentration. One consultant said that this pe
of eight weeks of learning can be sp
out over a whole school year.

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er a whole school year.

Teachers' Experiences

A number of teachers became discouraged and felt the initial judgments they made were illusory; other teachers were uncertain about how to motivate their students in order to progress at a rate more closely corresponding to schedule. Through concentrated and intensive work with the teachers, the consultants were able to revive the teachers' enthusiasm. The teachers learned to motivate students by demonstrating to them that impressive learning had already taken place—that they had in a sense, become "readers."

Groups in Classes

The teachers divided their classes into reading groups as it became evident that some children were absorbing the materials faster than others. Each grade handled this procedure in a different way. The first-grade teachers, for example, felt that their classes were not truly homogeneous and, hence, they combined forces so that their groups were composed of children from all four classes. The four teachers and two aides each worked with an individual group, and in some cases with more than one. They indicated that this has been a successful way of compensating for the differences in individual learning patterns.

Some of the second-graders were regrouped within their own classrooms; other classes were taught as a whole, with the teacher or consultant giving extra time to those children who were in difficulty. In the third grade one of the teachers reported that she worked with the group which was assimilating the material more slowly, while a consultant taught the more rapidly advancing group. When the consultant was not present, however, the teacher worked on skills with the entire class.

Children's Experiences

Within the framework of these groups, the children who had completed the tasks in Chart 2 were able to move through the remaining charts in an ordered manner, discovering in Charts 3-12, "all the sounds of English." *(R4, p. 2)* Charts 13-21 presented words which embodied the complete set of variant spellings for the sounds already mastered; and the eight-chart Fidel, or Phonic Code, served as a source of reference for these sounds.

By spring, most rooms displayed all the charts, indicating that at least a number of the children had covered the material in them. The children were able to test themselves from the exercises written on the blackboard and through the use of specialized materials. They had access to the Word Building Book, which allows the student to administer Visual Dictation to himself, and to the worksheets.

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The worksheets are designed to test the student's ability to combine signs to form words and to test his knowledge of the meaning of words. These activities were called the "Game of Completion." Gattegno considers these worksheets a device to foster the students' understanding of the algebraic operations involved in learning to read. Although Gattegno attaches great value to the worksheets, the students at PS 133 did not make extensive use of them.

In addition to work on "word attack" skills, comprehension is a "built-in" feature of the *Words in Color* program. The children read aloud to the teachers and to each other. If a child stumbled on a word, the teacher would ask him to locate it on the colored wall chart. The color cues helped him to recall the correct sound and then to decode the word in his book.

The *Words in Color* readers, at the outset, did not appear to generate much curiosity, but the students felt increasingly challenged as the restricted vocabulary was expanded. By the time the children reached Book 3 there was enough intellectual content in the stories for the pupils to answer questions which more significantly tested their comprehension. Illustrations are excluded from

virtually all the *Words in Color* reading books so that words rather than pictures are the fulcrum of the child's understanding.

As the children completed their work with the initial charts, they were exposed to a reading vocabulary that included words considered to be above the reading level of the primary grades. The children were intrigued with many of these words and were not discouraged by the fact that their meanings were not immediately clear. One writer on *Words in Color* notes:

> Many educators have severely criticized [Gattegno's] choice of vocabulary for the word charts, saying it is too adult and too unrelated to the interests of children. To prove such a point, one must use the charts with children, and discover that they love colorful and meaningful words and that 'filthy', 'impossible', 'courageous', and 'amoeba', are savored by them and thoroughly enjoyed. *(R11, p. 43)*

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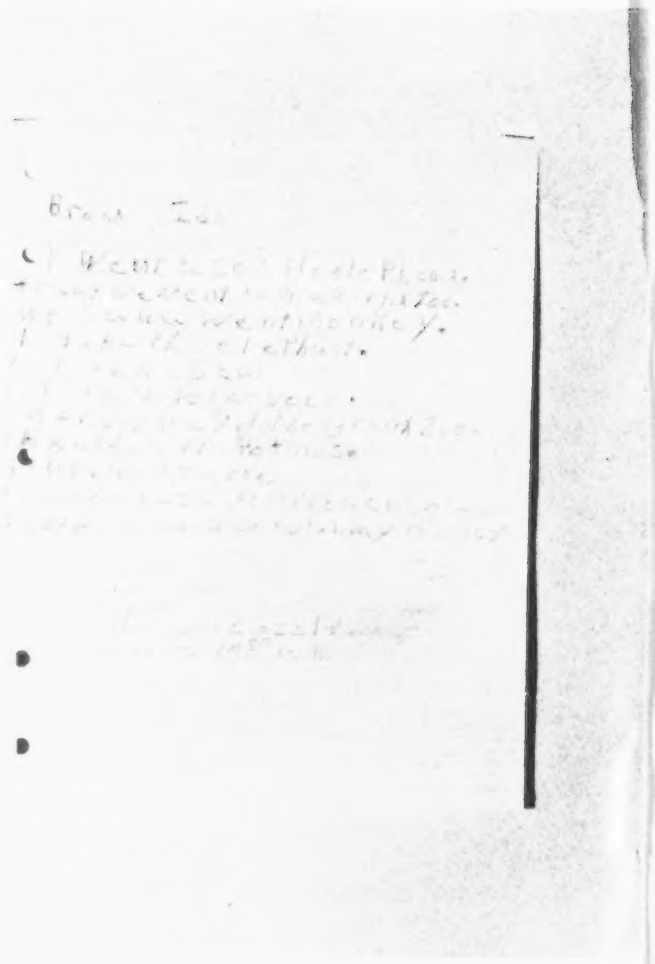
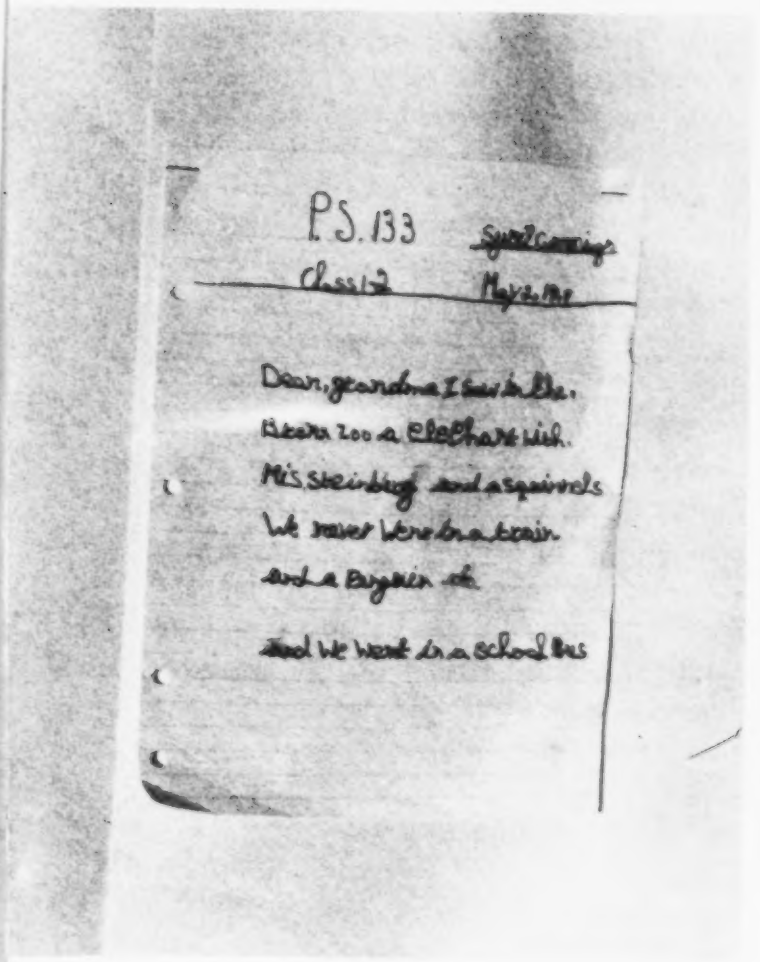
Another teacher stated that she probed only those definitions which she believed would be useful to her young students; still another felt that the vocabulary on the charts was too alien to the children and, as a result, she maintained they were unable to remember the words from one lesson to the next.




P.S. 133
Class 2
Dear, grandma I saw a Ele.
Also a Elephant with.
Mrs Steinberg and squirrels
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and a Bizzain ok.
and we went in a school bus

Creative Writing

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Spelling

The Fidel was also used to foster competency in spelling. If the child could not find a word on the chart, the teacher would help him work it out on the Fidel which provided the student with the necessary clues. In this way, the teacher not only avoided the temptation to spell the word for him but also helped the child to develop his own criteria for making judgments and correcting mistakes—a key aim of the *Words in Color* system.

In the process of writing stories, it should be noted, the children were free to help one another locate words on the charts. The children's sense of freedom in the program is suggested by the fact that they were not afraid to cooperate with each other in the completion of their tasks.

4 Mathematics in Color

The basis for this mathematics program came from the work of Georges Cuisenaire, the inventor of the colored rods bearing his name. In 1952, Cuisenaire's research had pointed up the mathematical properties of these rods. Cuisenaire, in fact, understood the rods as a device which coordinated seeing and doing, understanding, reckoning, and verification. They exemplified his "concept of teaching arithmetic by activity."

Gattegno went on to explore and refine the use of Cuisenaire rods in the teaching of mathematics. He found that the graduated color system fostered the rapid identification of the rods and, by enhancing the imagery of number values, also helped to capture the child's interest.

Use of Cuisenaire Rods

Gattengo adopted Cuisenaire's conception of rods as a representation of the basic mathematical operations: addition, subtraction, multiplication, and division of whole numbers as well as fractions. The performance of the rods in these fundamental processes highlighted the pattern and meaning of mathematical structures and relationships. Thus, though rods, in themselves, do not teach mathematics to the child, they do open up opportunities for discovery through the child's evolving awareness of the dynamics in different situations. Gattegno claims that students move rapidly from the use of the rods to abstraction and mental computation in order to derive answers to problems. As an experienced teacher pointed out, the Cuisenaire material "paradoxically as it may seem, enables students to reach an understanding of mathematical structures and frees them from the necessity to have recourse to a concrete support." *(R7, p. 2)*

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In Gattegno's approach, initial emphasis is given to free play, in which the student is not directed to relate the rods explicitly to mathematics.

> Empty a set on the table or floor and let the rods suggest what to do. Children are quickly absorbed by their own constructions and can produce so many objects and patterns . . . that no list can suggest what is possible, *(R3, p. 8)*

Gattegno states further that you will learn much about the child,

> his inventiveness, his endless capacity to renew his game, his sense of pattern, and the way in which, *while playing*, he picks up the essential concepts upon which mathematics is based. You will discover that he has an astonishing memory for abstract facts and a natural skill in mastering the relationships he finds exemplified in the colors and sizes of the rods. *(R3, p. 6)*

During this free play, the child discovers that rods of the same color are equal in length; that those with different colors have different lengths; and that to produce various equal lengths particular rods must be placed end to end. That the child *knows* all this will become clearer to the teacher as she *observes* him making use of this knowledge.

Concept of Equivalence

Great stress is placed on the concept of equivalence in which differences and similarities are perceived at the same time. Such perception leads to a vision of numbers as part of an infinite class in which some of its members can be substituted for others in order to find an answer to a given problem. This insight eliminates the need to introduce such notations as a "borrowing" in subtraction, one of the most confusing procedures in arithmetic to children. Learning how these operations and relationships are structured on an algebraic model releases the child from the forced memorization of number facts, time tables, and other similiar fixtures of the older methods.

Notation

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Notation

It is essential, Gattegno says, for notation to be introduced in the proper way. It is usually assumed that children must, in order to understand notation, "first learn to recognize figures, to distinguish them from one another and to faithfully reproduce them." *(R7, p. 32)* This traditional method often dissipates the energies of young children as they mechanically copy whole pages of 1's, 2's, and 3's. Rather than making the signs for the figures "objects," by telling children that "this is a four or a five," it is far more beneficial and logical to introduce notation only after operational competency has been achieved. Hence, number and mathematical relationships are not embodied in objects (signs).

> True, notation rests upon the experience acquired through the manipulation of the rods but it can only come on its own when the mind leaves the material and masters the significance of the manipulations. Between the perceptive exploration of the material and notation, the important phase of the conscious elaboration of the experiences takes place, which, if short circuited, results in the impossibility of understanding the universe of signs. *(R7, p. 35)*

Whereas we do not endeavor to teach the written form of speech before the pupil has acquired some knowledge of his spoken language, we insist upon the opposite in mathematics, by requiring him to write before he has demonstrated a capability for clearly formulating what he intends to write down. What usually occurs is that it is only the teacher who uses a mathematical vocabulary, and where this is done "the notation is handed out finished and complete, dictated by the teacher" placing the student in the predicament of "a foreigner, who, by hearing a language, can understand some of it but never dares to use it because of the absence of a true awareness of what is required." *(R7, p. 36-37)*

The use of the colored rods has the advantage of developing a notation which first takes into account the child's experience with concrete objects before attempting to translate his experience through such abstract entities as numbers. "Colors, the various ways of arranging the rods, must naturally suggest a vocabulary which is immediately accessible to small children . . . . The material leads to discoveries which are at the level of structures; hence the notation will from the start be about entities perceived as structured." *(R7,*

p. 38) Since notational arithmetic permits little experimentation and variation, the student when confronted with a problem of percentage, for example, either knows how to work it out, or else he can find nothing within the problem to aid him. With the rod the student

> is never at a loss when he encounters a situation, which in some aspects, is related to something he has already mastered. He moves from the known to the unknown by the aid of the rods and what they have revealed to him, so that, instead of being fearful of the unfamiliar, he is stimulated by it. *(R3, p. 81)*

Time Spent

In grades one through three, m matics was taught every day, ofte lowing a brief recess after readi the morning. Because of the inter- groupings, precise scheduling wa quired on the first-grade level, an instruction in mathematics was t fore concentrated in the early noon.

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In the second and third grades, grouping was less evident in mathematics than in reading. Most of the students worked on the same subject at the same time. The teacher or aide simply spent more time working with those who did not seem to grasp the concept involved in a particular operation.

The teachers lacked as specific a guide in mathematics as the one they had for *Words in Color*. They were often uncertain as to which operation was to follow another and were unsure of how to introduce the children to each operation. They relied heavily on the consultants to advise them on the sequence of instruction.

Materials

The program began in September with the introduction of the rods. Each child in the first three grades received a box of the colored rods, which were stored in individual desks or on a table at the back of the classroom.

The first phase, described as free play, gave the children the opportunity to handle the rods and explore some of the ways of manipulating them. Although the children enjoyed this activity, most of them moved rapidly to exercises suggested by the teachers. One teacher, however, reports that her first graders remained at the exploratory stage for approximately three months and, through the year, a few children could be observed in other classes who had apparently not progressed past this point.

Activities

A child who did not want to participate in the mathematics "game" was allowed to sit at his desk and play with his rods as long as he did not disturb the class. In a number of instances, the teachers found, the child gradually became involved in the activity of the class and began to make his rods perform as the teacher requested. The child was able to slip back into the activity of the group easily; because of the Gattegno methods, he did not have a backlog of memorization to make up.

The visual attractiveness of the rods was a factor in motivating the student to learn their corresponding color names, and it did not take long for them to master their accompanying number value.

During this early phase the concept of "equivalence" was conveyed to the students through mixing up the rods and then finding all those that were the same color or the same length.

After the children had some experience with this discovery exercise, they began to make "trains" by putting rods end to end. Once they could make a train in one color they were asked to make a train of two colors equal in length to the first train. Through this activity they acquired such concepts as "bigger" and "smaller," and learned about the processes of addition and subtraction by judging which size rods were needed to complete the second train.

Another activity included the construction of "staircases," which required that the rods be placed in sequence according to length. This operation reinforced the understanding of the relative numerical value of the colored rods. As children worked with their rods, they were introduced to mental computation. This entailed their stating which rod would be needed to complete a particular pattern before actually making it.

Before long the children used letters instead of color names to refer to the rods ("y" for yellow, "p" for pink, "w" for white, etc.); and once they had been taught the symbols +, —, and =, they were able to write equivalences in algebraic sequence. During the fall and winter children were writing expressions, such as:

$$y - p = w \qquad w + p = y$$

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which rod would be needed to
e a particular pattern before
making it.

e long the children used letters
of color names to refer to the
" for yellow, "p" for pink, "w"
e, etc.) ; and once they had been
he symbols +, —, and =, they
e to write equivalences in alge-
uence. During the fall and win-
ren were writing expressions,

$p = w$ $w + p = y$

In a similar manner the children explored multiplication and division. They used their rods to make congruent rectangles; from these they constructed "crosses" symbolizing the process of multiplication. A colored "product chart" was used to demonstrate graphically the learning covered by multiplication tables in the traditional teaching of arithmetic.

Fractions did not seem to perplex children. They could see that if a train of three *G* (light-green) rods equalled one *B* (blue) rod, then *B* was obviously three times as big as *G;* and *G* was, therefore, one third the size of *B*. The teachers, however, seemed insecure when it came to teaching fractions.

Teachers' Experiences

When the teacher or the consultants worked with the class as a whole it was sometimes difficult to tell how many children actually understood the operation under discussion. Often one or two children in each room would call out the answers to problems before any of the other students had the opportunity to work them out. The teachers, therefore, spent a considerable amount of time going from one desk to another to check that each individual had really mastered the procedure.

The teachers also used other means to verify the children's progress. Some of them used material from standard grade-level textbooks, for homework or classroom review. Others used exercises taken from the Gattegno pupil books;* or they rexographed copies of "Exploration Sheets," which provided lists of equations for which the children would have to find the answers. These materials were used occasionally for homework and "quietwork" in school.

**These pupil books, "Mathematics with Colored Rods," were not issued to the students at PS 133 because they required a degree of reading proficiency which the children did not possess.*

Children's Experiences

One of the objectives of the mathematics program was to make the students conscious of the fact that every situation potentially yields a number of other situations, each of which is capable of mathematical exploration. Once the children discovered these possibilities they felt greater confidence and were receptive to more complex mathematical challenges. The library teacher reported that in the spring a number of children sat in the back of the library making up long lists of equations and completing them one after another. During the year, most of the classes learned to read large numbers, to deal with numbers of different bases, and to calculate the square roots of many numbers.

5 Teacher Training

In a survey of current literacy materials, James Moffet notes that of available curricula "*Words in Color* probably requires the most learning and effort on the part of the teacher." He suggests that "teachers who are to use it should see demonstrations of it or, better still, attend a workshop given by one of Gattegno's associates." *(R10, p. 89)* Such workshops constitute one of the ongoing activities of Schools for the Future, and provide a useful means of introducing the range of materials and instructional techniques developed by the Foundation.

Workshops

The workshops also represent an intensive effort to change basic teacher behaviors. An article about a workshop on reading, conducted by Gattegno in December 1968, describes the participants as "involved in subtle, ineffable process of self-confrontation that shook some and convinced others that they knew less about teaching and learning and even themselves, than they had." *(R14, The Center Forum, p. 6)*

Gattegno's concern with the relationship between teaching and learning lies at the core of his work. "It is indeed remarkable," he notes, "that so many children end by knowing something with the methods of teaching we use which disregard how learning takes place." *(R5, p. 27)* Criticizing such common instructional practices as repetition and drill, the unhesitating correction of students' mistakes, and the use of praise and other 'motivation' devices, Gattegno warns that these interfere with and distract the student from his learning. "The excitement the pupil feels inwardly in meeting those challenges inherent in the intellectual game is more than sufficient motivation." *(R4, p. 14)*

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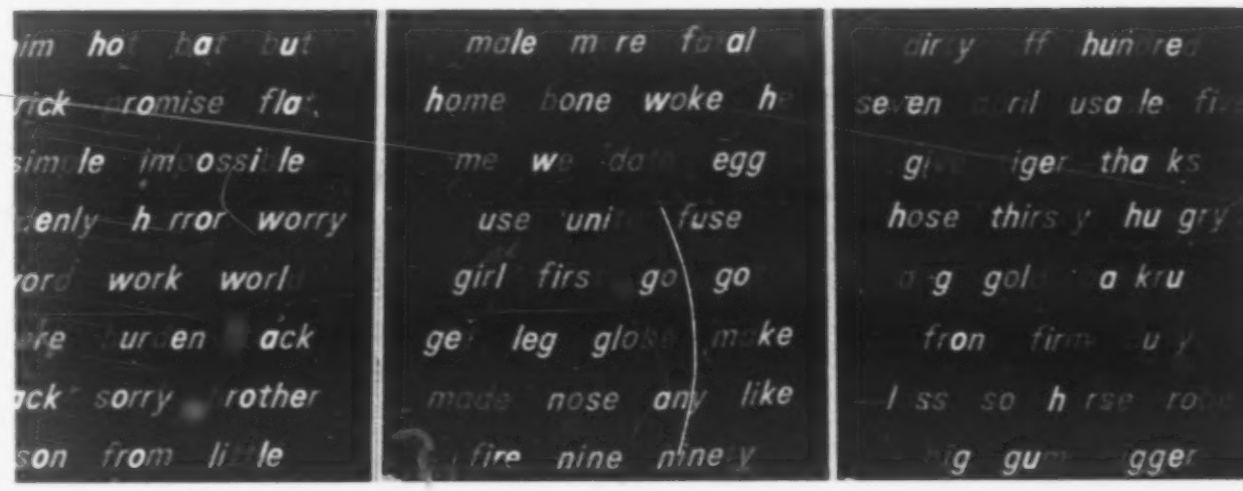
In Gattegno's view the teacher's assumptions about her role in the learning process have to be modified. "Only when we as teachers discover how to become useless to our pupils have we created the proper conditions for learning and creativity." *(R5, p. 4)* In other words, the teacher employing Gattegno's techniques will "hand out" only that part of the skill which the student cannot discover or apprehend himself, and delegate responsibility to the learner for those parts that must be his. For example, as soon as the student understands the approach to decoding and coding words, "the teacher has a reduced part to play in the learning-teaching transaction." *(R5, p. 72-73)*

Changes in Teaching Strategies

The changes in teaching strategies that would affect the teacher's role in the classroom, according to Gattegno, involve "the subordination of teaching to learning."

> Patience is a necessity to achieve our goal: the solution by the learner of his problems, of which we may have only a hint by observing his mistakes. In our approach, the teacher very soon has the role only of analyzing the steps taken or to be taken by the pupils. Although the teacher seems not to teach at all, he is constantly observing mistakes and finding ways of overcoming the obstacles in the way of the pupils. This is truly creative teaching and infinitely more rewarding than endless drilling and quizzing and correcting. *(R5, p. 29-30)*

Consequently, teacher training (or retraining) at PS 133 became not only a means of helping the teachers to work with *Words in Color* and *Mathematics in Color*, but also a primary objective. In the course of the year, a variety of training experiences was made available to the staff or the school. Included were the above-mentioned workshops, held on weekends and school holidays at the Schools for the Future headquarters located in Manhattan. Even more important was the work of the consultants who moved from classroom to classroom demonstrating the Schools for the Future approach, giving lessons that were directed as much at the teachers as at the students. In addition, the staff took part in a special two-week workshop before the fall term, an after-school in-service seminar, and a series of weekly grade conferences during school hours.



The Summer Workshop

Shortly after the school had decided to institute the program the 11 classroom teachers were asked to attend a two-week workshop conducted by Gattegno and his associates in late August 1968, at a private school in Manhattan. Nine teachers were able to attend, for which they each received a fee of $75.00 a week. Meetings lasted from 9 A.M. to 5 P.M., and babysitting services were arranged on the premises for the convenience of those teachers with children.

The meetings of the first week were directed toward getting the teachers to reexamine their approach to teaching. An observer at the workshop describes the proceedings as follows:

Gattegno, shirtsleeved, tieless, smiling enigmatically, met them on the first day with a rigorous assault on their most cherished educational ideals. They had come clearly not expecting to have much demanded of them. Gattegno . . . wanted them for starters to describe the process of perception. When they responded feebly he made them confront the fact. Defensive and somewhat displeased, they wrote off the assault as an intellectual exercise. After two days, however, all of them were intellectually numb; some felt painfully exposed, personally as well as professionally; the notion they held of themselves as teachers had changed (for some it almost disappeared).

He stripped them of professional pretense and then worked toward having them accept the notion that people from birth have enormous capacity to learn (and to demonstrate this he taught the teachers to read Amharic, Sanskrit and Greek in an hour); that people exhibited this capacity in learning to speak their mother tongue (and he made the teachers piece together, like archeologists, the labor of an infant

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A child came to school, Gattegno asserted acutely alert to sound, intensely preoccupied with the use of his senses for fitting himself to the world, fresh from the experiences of becoming a one year old, a two year old, a walker, a maker of sounds, a talker, and so on, and he picked up on a teacher's every utterance, even the misleading ones. If a child couldn't learn to read, it had learned not to read, Gattegno held, and invariably it had learned from a teacher. When he said it, some teachers winced.

The same held for mathematics, he said. Mathematics is pure logic, a finely ordered universe. Children are not wont to deny logic and ordered universes when they find them. Mathematics should be no more difficult for a child to learn than speech. But adults don't have a firm purchase on logic, Gattegno held, and teachers, on the whole, aren't given to logical distinctions. In fact, Gattegno maintained, teachers had become so accustomed to fitting their classroom experience to schema that their own process of thought and learning had become alien to them. Before his argument could be discarded as presumptuous, Gattegno asked the teachers for their thoughts. He drew silence, sheepish questions about what he wanted to know, even praise for his notions, but no one's thoughts.

By the end of the week, esch jargon, he had rehearsed techniqu using the teachers' children, who along every morning to be cared f a babysitter, he demonstrated tha conceptions about what and how children could learn in a given p of time were generally without stance. In the space of 90 mi spread over two days, sounding vowels, he taught a couple of the dren to read and one to read on a complex level (by her mother's acc ing) than she'd ever managed bef he taught the children to read Gr he had them working with numeral ten digits.

The teachers remarked on his tience. Patience in teaching isn't a tue, Gattegno said, it is a necessity was a point he made many times.

When the week ended, Gattegno the teachers they had to do two thin Grant children what they are, a re tively easy thing to do; and attend the way in which each child functio a relatively difficult task. (R15, p. 17)

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During the second week the two consultants assigned to PS 133 led the meetings, which served to introduce the teachers to the special methods and materials in reading and mathematics.

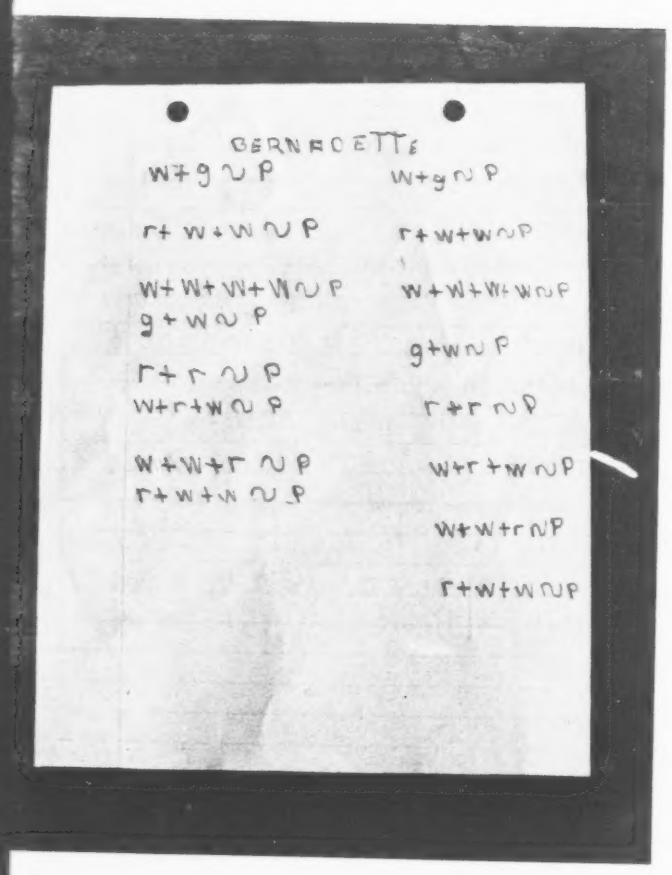
The workshop seemed to have had a major impact on the teachers. Several told the analyst that their classroom behaviors were greatly influenced by the experience; that they began the school year with a new approach to teaching and a radically different assessment of their students' capabilities. The three teachers who did not attend realized, during the year, that they lacked insight into Schools for the Future methods and, subsequently, attempted to compensate by participating in some of the weekend workshops.

The Inservice Seminar

The training was continued during the year in an officially-approved in-service seminar titled "The Subordination of Teaching to Learning," given at the school every Monday from 3 to 5 P.M. The teachers refused a nominal reimbursement for attendance, opting instead to receive inservice credit from the New York City Board of Education. Most of the sessions were devoted to discussions of techniques of teaching reading and mathematics (such as Visual Dictation and Games of Transformation); a few dealt with broader topics such as comprehension and motivation.

Fatigue was something of a problem as would be expected in any course which immediately followed a full day of teaching. However, attendance was regular except for two teachers who were not able to attend at all. A few of the teachers not directly involved in the program also participated.

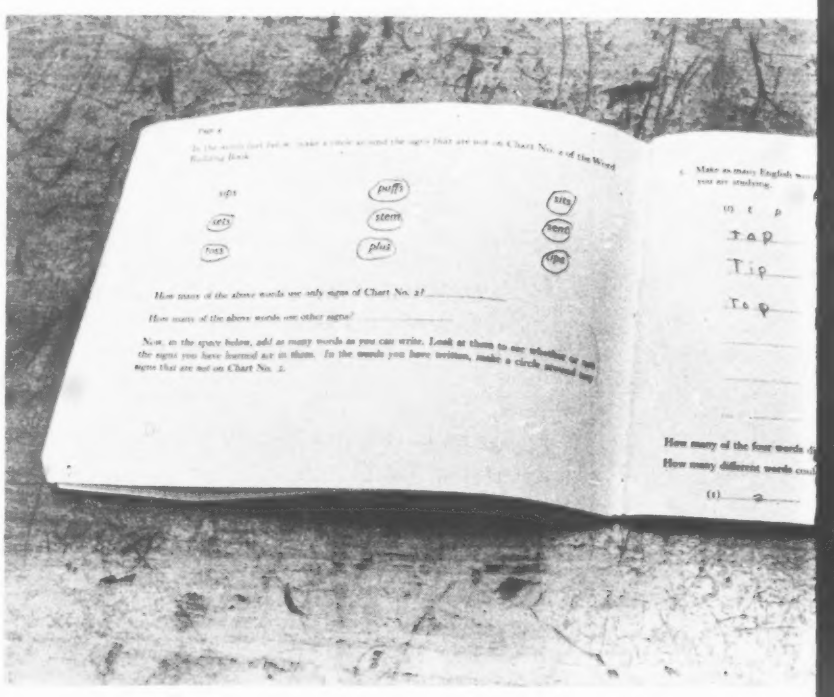
Most participants felt that the after-school seminar was useful, and they hoped it would be resumed in the second year. One of the consultants suggested the idea of giving the teachers advance notice of discussion topics, thereby giving them time to assemble their thoughts before the meetings.



Weekly Grade Conferences

All the teachers in the program voluntarily gave up one free period a week for a conference with the consultants. As each meeting was limited to a single grade level, the conferences were able to deal with the specific problems of individual teachers; for example, the concerns of teachers whose students had begun the year with some knowledge of reading, or had failed to master it in prior attempts, and of those teachers whose students were getting their first formal introduction to reading through *Words in Color*. The consultants discussed with each teacher their observations of her classroom performance, and, conversely, the teachers commented and asked questions about lessons taught by the consultants. By providing a formal setting for frank discussions of instructional matters, the conferences seem to have produced a closer working relationship between the consultants and individual teachers.

Even with the heavy emphasis on teacher training, at the end of the year a few teachers still were not confident of their ability to work effectively in the program. While noting that their students had made impressive gains, these teachers were unsure whether they were truly guiding the learning process. Mathematics instruction was an area of particular concern, and almost all teachers felt that more training would be useful.



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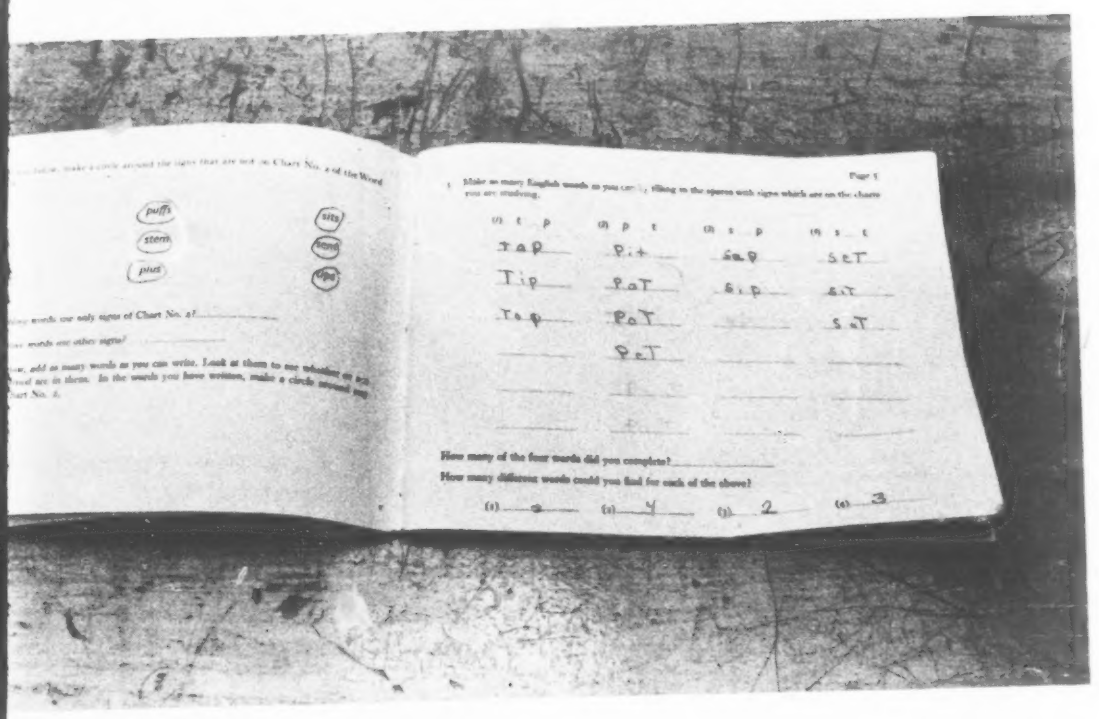

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6 Evaluation

The implementation of the Schools for the Future project followed a course charted by the consultants in conjunction with the teachers at PS 133. Because the IS 201 schools were not affected by the New York City teachers' strike, the program began on schedule and continued throughout the year with no interference from the administration or from outside sources. This was the first extended demonstration project of the School for the Future system in the New York City public school system. Unlike most programs instituted in low-income areas, this one was not designed to compensate for the students' backgrounds; it was intended to help the teachers work on the perceptions and abilities which Gattegno claims are common to all children.

Test Scores

Although the data for obje
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TABLE 1 READING: COMP
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	Mean Score Equivalent
PS 133 Mean	
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TABLE 2 ARITHMETIC: CO
SCORES FOR GRADE 3* (M

	Mean Score Equivalent
PS 133 Mean	
District Mean	
Citywide Mean	

*The New York City standardized

est Scores

Although the data for objective evalation of the Schools for the Future rogram at PS 133 were insufficient, ney did yield some tentative conclusions. The Metropolitan Achievement est (MAT) scores, which provided our nly statistical data, tended to indicate eneral improvement in reading and athematics within the target group.

The following tables are based on the AT that is administered to children in e New York City public schools in the pring of each year. Although the Schools for the Future program was included in the first through third grades, standardized tests were not administered to first-graders, so that their accomplishments cannot be assessed in this manner.

Table 1 lists the mean grade equivalent scores in reading for the second and third grades in March 1968, before the Schools for the Future program was instituted and for March 1969 by which time the program had been in progress for approximately seven months.

For PS 133, the mean grade equiva-

ABLE 1 READING: COMPARISON OF METROPOLITAN ACHIEVEMENT TEST CORES FOR GRADES 2 AND 3 (MEAN GRADE EQUIVALENTS)

Mean Score Equivalent	*Grade 2*		*Grade 3*	
	1967-1968	1968-1969	1967-1968	1968-1969
PS 133 Mean	2.6	2.8	2.9	3.5
District Mean	2.3	2.3	3.0	3.1
Citywide Mean	2.7	2.8	3.7	3.6

ABLE 2 ARITHMETIC: COMPARISON OF METROPOLITAN ACHIEVEMENT TEST CORES FOR GRADE 3* (MEAN GRADE EQUIVALENTS)

Mean Score Equivalent	1968-1969	1969-1970
PS 133 Mean	2.8	3.2
District Mean	3.0	3.2
Citywide Mean	3.5	3.5

The New York City standardized testing program in arithmetic does not include grade 2.

lents for reading are based on the following numbers of students: Grade 2, 1967-68, N = 83 and 1968-69, N = 89; for grade 3, 1967-68, N = 74 and 1968-69, N = 71.

The second grade scores for 1967-68 show that the grade was functioning at .1 below the citywide mean score in reading. The 1968-69 second graders tested at 2.8, reflecting a rise of .2 and raising the level of the children who were tested in PS 133 up to that of the 1968-69 citywide mean score. The district mean score remained unchanged.

In the third grade, the mean score had been 2.9. Third graders in the period under review reached a mean score of 3.5. They also approached the citywide norm, having narrowed the gap from .8 to .1.

The IS 201 mean score represents the average score of the district's elementary schools. The second grade score of PS 133 was .5 above the district mean score in 1968-69; and its third graders moved from .1 behind the district average in 1967-68 to a point significantly above the IS 201 average in 1968-69. Thus, Table 1 would indicate that in 1968-69, PS 133 showed progress in relation to its own previous test scores as well as those of the IS 201 district and the city as a whole.

Table 2 compares the mean grade equivalent scores in mathematics. The third grade scores reveal a .4 increase in 1968-69. (The district mean score of 3.2 is identical to that of PS 133.) Despite the improvement which brought the score of PS 133 up to the level of the district mean score, both PS 133 and the IS 201 schools, i functioning .3 below the score. For PS 133 the mea alents are based on the ber of students: grade 3, 76, 1968-69, N = 73.

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TABLE 3 READING: METROPOLITAN ACHIEVEMENT TEST ME MONTHS BETWEEN GRADES 2 AND 3, PS 133 (N = 44)

Grade Level Equivalents 2nd Grade (1967-1968)	Mean Gain* (3/68 - 4/69)
2.1 and below (N = 13)	.9
2.2 - 3.2 (N = 14)	1.2
3.3 and above (N = 17)	.7

*Expected gain = 1.0; district mean gain = .8; citywide mean gain = .9.

TABLE 4 ARITHMETIC: METROPOLITAN ACHIEVEMENT TEST IN MONTHS BETWEEN GRADES 2 AND 3*, PS 133 (N = 44)

Grade Level Equivalents 2nd Grade (1967-1968)	Mean Gain (3/68 - 3/69)
2.1 and below (N = 7)	.8
2.2 - 3.2 (N = 26)	.7
3.3 and above (N = 11)	.7

*Scores for grade 2 in PS 133 are available as the result of an experimental in 1967-1968.

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dren made progress, or if improvement was linked only to those who had previously tested well.

The test in mathematics had been administered experimentally at the second grade level in some schools in 1967-68, including PS 133. Four test scores were available for only 44 of the current third graders. The 44 children were divided into three groups. The national norm of 2.7, with a range of plus or minus five months, was used as the basis for the middle group. This provided the most even distribution in examining the gains in reading. (The same data were checked on a range of 2.7 plus or minus three and four months, and there was no variation of more than .1 in mean gain.)

Table 3 shows that the middle group of 14 children achieved a mean gain of 1.2, while the lower group, who were reading below grade level in 1967-68, show a mean gain of .9 in their recent test scores. Every child in the lowest group made some progress between the tests. Moreover, children in this group had a mean gain greater than that of the district as a whole and equal to that of the city.

Similarly, Table 4 compares the mathematics test scores for 1967-68 and 1968-69. The same basis for grouping was retained, although it provided a less consistent distribution of the 44 children. A range of plus or minus three months provided more even distribution of the children but effected no significant variation in the mean gain. The mean gains in mathematics are less than those in reading, although the gain in the lower group again demonstrated that every child improved to some degree.

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Staff Reactions

The personnel from the Schools for the Future Corporation were extended great cooperation by the school staff. The program was not implemented to the same extent in all 11 participating classes. There were two classes in which the Initial Teaching Alphabet (ITA) was the mode of teaching reading. One of these was a second grade class which had received ITA training in the first grade. In the fall, the teacher used ITA and incorporated certain features of the *Words in Color* system; by midwinter, only the *Words in Color* was used.

The two consultants, in conjunction with Gattegno, have been working on their own test which they feel will be a more reliable instrument to gauge the students' achievement.

Mrs. Hercules, the acting principal, felt that a change for the better was obvious even without test results. She stated that the climate of the school during the program year indicated a positive change in the way the teachers and the children felt about each other. Moreover, Mrs. Hercules considered that her staff was to be admired for their willingness to embark on a new program and for their industriousness in carrying it out. Through this project, she was convinced, they developed a

new attitude toward their profession: many of the experienced teachers learned to question their own methods when confronted with a child who did not appear to be learning, rather than to immediately conclude that the child was "unteachable." She pointed to their new awareness that all children can be taught to read and to do mathematics on a higher level.

Mrs. Hercules participated actively in the Schools for the Future program, observing the teaching methods in the classrooms and attending a number of the seminars with the teachers. Her support of the teachers in the program was evident throughout the year. She was on hand to reassure them when some felt they were unable to properly implement the methods. She also tried to ward off any possible anxiety among the teachers which might result from the fact that one pupil group was scoring at a higher level than another or that the program was allowing too little time to cover the curricula in other subjects, such as science and social studies.

In her view, any evaluation of the program must take into consideration the fact that: 1) teachers were not comfortable with the program until December and, as a result, were not teaching at their optimum level this year; and 2) that the program will be more efficient in the second year because the teachers will have the advantage of the first year's experiences.

The teachers saw their own growth mirrored in the accomplishments of their students during the first year. Most of the participating teachers felt that their attitudes towards their pupils had been greatly affected as a result of Gattegno's seminars. One teacher commented that as a result of the program her "educational philosophy underwent a radical change . . . I had to reevaluate my position . . . become more aware of my own dynamics of learning and in turn make the children more aware of their self-contained power." A change in teachers' perceptions, particularly regarding the expectation they had for their students, was also noticed. Many of the teachers viewed their previous failures as resulting largely from their own inability to adjust the teaching situation to cope with individual learning patterns. For example, one teacher remarked that as she "gained
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teacher remarked that as

she "gained more confidence in her ability to perform in this program, progress was tremendous. The children were eager and produced astounding results."

The teachers cited many instances of their students' achievements this year, most of them in reading. A very experienced teacher, who had a "low average" second grade class, reported that in September most of the children in her class were reading the Bank Street primers. "Now more than twenty children are able to decode most new words they encounter and are at grade level, although there are still individual differences in achievement." She reported that "without a doubt" this program had been more effective for her than any previous reading approach.

A teacher of a "low" third-grade class noted that tremendous gains were made by a large percentage of her students, who were all reading below grade level in the fall. A number of her pupils were moving to a higher-ranked fourth-grade class the following fall. The "attention" factor in the *Words in Color* program had the salutary effect of eliminating many of the behavior problems within her classroom.

The "top" third-grade class teacher felt that her students were competent readers, and she utilized the help of the consultants and the *Words in Color* charts primarily in spelling instruction, an area in which the children were weak. This group was also taught mathematics with two third-grade texts as well as through exposure to the Gattegno material.

A young teacher, who switched her grade level assignment so that she could participate in the project, claimed that this was the first year in which she felt that she had really "gotten through" to the children. She assigned major importance to *Words in Color* which made it possible for a number of holdovers, who had considered themselves failures, to learn to read successfully.

A number of teachers spoke with pride of the multiplicity of mathematical operations which the children were able to do. They could certainly work with numbers up to 20, the basis for the old arithmetic curriculum; and since they were "liberated" from the traditional methodology a more varied field of operations, with algebraic components, was offered to them.

The comments regarding both pro
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The comments regarding both programs, however, were not unanimously favorable. Among the criticisms made were the following: the program should be preceded by more reading-readiness work; it needed a separate component for the teaching of phonics; it called for a degree of informality for which some of the less mature students were not ready; the mathematics program was too diffuse, developing skill in reading large numbers in advance of evidence that arithmetic operations could be performed with proficiency; the delegation of responsibility for learning to the students is a questionable notion, because some children simply do not possess such an attitude.

A few of the teachers who were not deeply committed to the program attempted to adhere to the nucleus of the system while applying some of their own methods and philosophy to their general classroom management. But even those teachers who voiced objections felt that the program should be given at least another year of experiment.

All of the staff members were generous in their praise of the two full-time consultants who, they remarked, had been cooperative, understanding and tireless. Most teachers did not feel confident enough to begin the next year without consultants.

This feeling of dependence was the basis of criticism levied by some individuals who watched the program closely during the school year. They believed that the consultants should have been phased out of the school by the spring; after that point, they should have only been observing the teachers and advising them, rather than teaching classes themselves. These critics maintained that the teachers should be able to carry on the following year with only occasional conferences with consultants, supplemented by additional seminars with Gattegno. There is a tacit question as to whether the program has been as successful in transmitting feelings of independence to the teachers as it has to the children. (As of this writing, October 1970, the consultants are still working at the school, although not on a full-time basis.)

The consultants agreed that they should be eventually eliminated, but that they could continue to be of great benefit to the teachers because they now had

(1) a close working relationship with the staff members as well as the children; (2) a better insight into how to help the teachers challenge those children who do not respond quickly; and (3) an increased awareness of the relationship between the school and the home environment. The children themselves reflected the effects of a good relatonship with the consultants. They felt very comfortable with both consultants, and even those students who did not participate directly in the program were observed wandering in and out of their office, offering to run errands for them or asking to experiment with the Schools for the Future materials.

Initially, many of the parents were concerned about having their children involved in an experimental program. Furthermore, homework was a source of contention; either there was none assigned, they asserted, or the work requested was in a form they could not understand. Attendance at the parent workshop was not large, but as the children's accomplishments became evident, the parents' fear seemed to be allayed; by the end of the year they had a much more positive attitude towards their children's participation in the Schools for the Future program.

7 A Second Look

In a follow-up visit to PS 133 in May 1970, a number of developments were noted. During the 1969-70 school year, the program was extended to include kindergarten through the fifth grade, encompassing a total of 508 children in 22 classes.

Of the 22 teachers, 12 were new to the program. Several attended a two-week training workshop in August 1969. In addition, six or seven weekend seminars were conducted in the course of the school year by Gattegno or members of his staff. One consultant reported that, although some of the teachers are still "not comfortable" with the program and have been slow to adopt the methods fully, there have been no "dropouts." He noted that a number of previously uncommitted teachers, reacting to the enthusiasm of collegues, have gradually developed greater acceptance of and interest in the program.

The two original consultants remained at the school; another consultant from the Schools for the Future staff was added in September 1969. Each of the consultants concentrated on seven or eight classrooms, helping in both reading and mathematics. In contrast to the first year, they did less teaching i classrooms, and focused more on o vations, demonstrations, and co ences with the teachers. Their activ ranged throughout the grade in fle ways. One consultant emphasized his functions were "not rigid," changed according to the observe stated needs of the teachers. stressed was a constant reevaluati the day-to-day methodology. Classes organized for both small group whole class instruction, in accord with needs of both children and te ers. Mrs. Hercules expressed the that, after the Center's connection the program had come to an end, i could be obtained from other sourc maintain the consultants on staff. felt strongly that they were still ne

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first year, they did less teaching in the classrooms, and focused more on observations, demonstrations, and conferences with the teachers. Their activities ranged throughout the grade in flexible ways. One consultant emphasized that his functions were "not rigid," but changed according to the observed or stated needs of the teachers. Also stressed was a constant reevaluation of the day-to-day methodology. Classes were organized for both small group and whole class instruction, in accordance with needs of both children and teachers. Mrs. Hercules expressed the hope that, after the Center's connection with the program had come to an end, funds could be obtained from other sources to maintain the consultants on staff. She felt strongly that they were still needed.

By the end of 1969-70 school year all of the second grade teachers had been using Gattegno's method for two years. In the third grade, two teachers had used *Words in Color* and *Mathematics in Color* for two years, and two teachers were newcomers to the technique. However, the pupils in the second and third grades (except for transferees) had been in the program for two years. All the fourth and fifth grade teachers were using the system for the first time because it had only been extended to these grades in September 1969. The students in the fourth grade had already been exposed to the method for one year. Their teachers were using it for the first time. The method was new for all the fifth grade pupils.

The 1970 achievement test scores show some changes when compared with the previous year's data for each grade. As Table 5 shows, the reading scores of this year's second graders demonstrates improvement over second grade scores for past years—the mean second grade score is now .7 years above the citywide mean and 1.1 years above the district mean. In grades three, four, and five the reading scores also indicate improvement (Tables 6, 7, and 8). Third grade students, with two years of participation in the program, scored .8

TABLE 5 READING: COMPARISON OF METROPOLITAN ACHIEVEMENT TEST SCORES FOR GRADE 2 (MEAN GRADE EQUIVALENTS)

Mean Score Equivalent	1967-1968	1968-1969	1969-1970
PS 133 Mean	2.6	2.8	3.6
District Mean	2.3	2.3	2.5
Citywide Mean	2.7	2.8	2.9

TABLE 6 READING: COMPARISON OF METROPOLITAN ACHIEVEMENT TEST SCORES FOR GRADE 3 (MEAN GRADE EQUIVALENTS)

Mean Score Equivalent	1967-1968	1968-1969	1969-1970
PS 133 Mean	2.9	3.5	4.4
District Mean	3.0	3.1	3.6
Citywide Mean	3.7	3.7	3.7

TABLE 7 READING: COMPARISON OF METROPOLITAN ACHIEVEMENT TEST SCORES FOR GRADE 4 (MEAN GRADE EQUIVALENTS)

Mean Score Equivalent	1968-1969	1969-1970
PS 133 Mean	3.7	4.6
District Mean	3.7	4.0
Citywide Mean	4.6	4.6

TABLE 8 READING: COMPARISON OF METROPOLITAN ACHIEVEMENT TEST SCORES FOR GRADE 5 (MEAN GRADE EQUIVALENTS)

Mean Score Equivalent	1968-1969	1969-1970
PS 133 Mean	4.4	5.4
District Mean	4.1	4.7
Citywide Mean	5.5	5.6

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67-1968	1968-1969	1969-1970
2.6	2.8	3.6
2.3	2.3	2.5
2.7	2.8	2.9

TROPOLITAN ACHIEVEMENT TEST
QUIVALENTS)

67-1968	1968-1969	1969-1970
2.9	3.5	4.4
3.0	3.1	3.6
3.7	3.7	3.7

TROPOLITAN ACHIEVEMENT TEST
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68-1969	1969-1970
3.7	4.6
3.7	4.0
4.6	4.6

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68-1969	1969-1970
4.4	5.4
4.1	4.7
5.5	5.6

years above the district mean and .7 years above the citywide mean (Table 6). In the fourth grade, pupils had been using the method for two years and, as indicated in Table 7, they too showed progress. Their mean score of 4.6 is .6 years higher than the district mean whereas in the previous year the fourth grade mean in PS 133 equaled that of the district mean. In 1968-69 the mean score in the fourth grade was .9 years *below* the citywide mean; this year it is *at* the citywide average.

No fifth grade students nor their teachers had experience with *Words in Color* before 1969-70. Table 8 shows that their mean score is .2 years below the citywide mean this year whereas there was a disparity of 1.1 years in 1968-69. Thus there were similar changes in relation to the district mean. Compared to the previous year's fifth grade class, this year's class was a full year ahead. The New York City Board of Education had not yet made available the achievement test scores in arithmetic for grade three, therefore no analysis was possible.

Table 9 presents scores for the fourth grade. A comparison of the mean grade equivalents for the 1969 and 1970 groups shows that although the latter is ahead of the former at the end of their respective school years, the gains in arithmetic are less than those in reading. At the mean, pupils are still well below grade level. The 1970 mean score, however, is closer to the district and citywide means than was true in 1969. On the whole, the aggregate mean scores suggest real gains.

TABLE 9 ARITHMETIC: COMPARISO
ACHIEVEMENT TEST (1969) AND IO
(MEAN GRADE EQUIVALENTS)

Mean Score Equivalent
PS 133 Mean
District Mean
Citywide Mean

8 Budget

The costs of the program for the first two years, other than the normal school expenditures, were paid by the Center for Urban Education and amounted to approximately $97,000. The following figures comprise all such costs for the periods from August 1968 through the school year ending June 1970.

TABLE 10 BUDGET: BEGINNING

1968-69, 1969-70
Salaries (for resident consultants)
Consultants
Teacher training seminars (fees and other costs)
Fringe benefits
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TABLE 9 ARITHMETIC: COMPARISON OF SCORES FOR GRADE 4 METROPOLITAN ACHIEVEMENT TEST (1969) AND IOWA TEST OF BASIC SKILLS (1970) (MEAN GRADE EQUIVALENTS)

Mean Score Equivalent	1967-1968	1968-1969
PS 133 Mean	3.1	3.6
District Mean	3.4	3.7
Citywide Mean	4.1	4.3

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TABLE 10 BUDGET: BEGINNING READING AND MATH IN P.S. 133

1968-69, 1969-70	1968-69	1969-70
Salaries (for resident consultants)	$25,000	$35,000
Consultants	4,185	9,565
Teacher training seminars (fees and other costs)	3,385	6,635
Fringe benefits	2,500	3,500
Supplies and materials	2,823	4,200
	$37,884	$58,900

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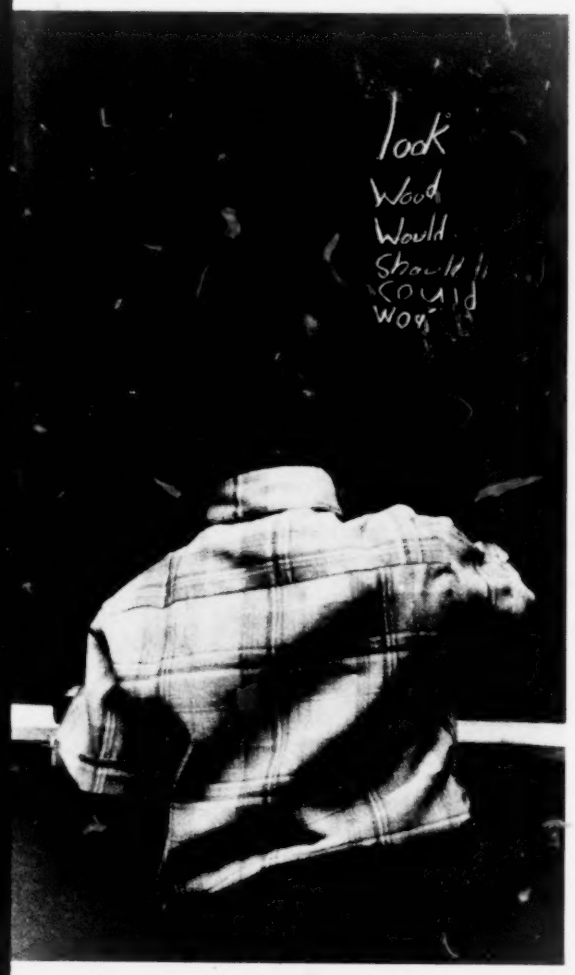

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